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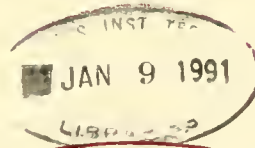
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**STRATEGIC ALIGNMENT:
A MODEL FOR ORGANIZATIONAL
TRANSFORMATION VIA
INFORMATION TECHNOLOGY**

**John Henderson
N. Venkatraman**

November 1990

**CISR WP No. 217
Sloan WP No. 3223-90**

Center for Information Systems Research

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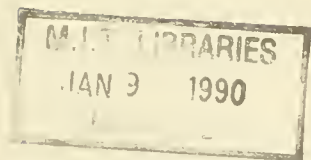
Strategic Alignment: A Model for Organizational Transformation *via* Information Technology

Abstract

This paper develops a model for research and practice of strategic management of information technology. The model, termed the Strategic Alignment Model, is defined in terms of four domains of strategic choice: business strategy; information technology strategy; organization infrastructure and processes; and information technology infrastructure and processes -- each with its constituent dimensions. The model is conceptualized in terms of two fundamental characteristics of strategic management: strategic fit (i.e., the interrelationships between external and internal domains) and functional integration (i.e., integration between business and functional domains). A set of propositions is developed based on this model with implications for research and management practice.

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Introduction

As organizational transformation emerges as an important theme among both management scholars and practitioners, it is perhaps a truism that the organizations of the 1990s will be significantly different from those of the last few decades. While several factors have been argued to influence and propel the organizational transformation process, as the papers in this volume attest, a major force lies in the recent developments and capabilities offered by information technologies (I/T) -- namely, computers and communication technologies. This is mainly due to the acceleration of power and capabilities of these technologies with corresponding improvement in cost-performance ratio in recent years (Scott Morton, 1990). Over the last few years, several different arguments have been offered to highlight the potential of I/T to influence competitive characteristics (see for instance, Keen, 1986; McFarlan, 1984; Parsons, 1983; Porter and Millar, 1985; Rockart and Scott Morton, 1984; Wiseman, 1985) as well as enable and shape business transformations, but there is a glaring lack of systematic frameworks to conceptualize the logic, scope and patterns of organizational transformation enabled by information technology (I/T). To help address this deficiency, this paper develops and presents a conceptual model with a set of propositions and management implications.

Our paper is based on a pivotal premise, namely: recently, the *role* of information technology in organizations has shifted beyond its traditional, 'back-office, support' role towards an integral part of the strategy of organizations. Following King (1978), Rockart and Scott Morton (1984) and others, we differentiate among three major roles for I/T -- 'administration'; 'operations'; and 'competitive.' The *administration* role signifies the scope of I/T as the automation of accounting and control functions, which is reasonably well-understood in the traditional literature on management information systems (see for instance, Ein-Dor and

Segev, 1978; Ives, Hamilton, and Davis, 1980). Indeed, the importance of technology for streamlining the activities of payroll, accounts payables and accounts receivables is taken as given and is not worth elaborating here. Suffice to state that this role requires the deployment of an efficient I/T platform (including hardware, software and communication systems) for administration and control and is independent of the strategic management of the organization. The *operations* role is an extension of the first role and is distinguished by the creation and deployment of a technology platform that creates the capability to automate the entire set of business processes as opposed to only the administrative activities. This role requires the deployment of an I/T infrastructure that responds to and supports the chosen business strategy (King, 1978; McLean and Soden, 1981).

Following Grant and King (1978), Hax and Majluf (1984), and Hofer and Schendel (1978), strategic management can be viewed in terms of a hierarchy of three levels of strategies: *corporate strategy* (concerned with the portfolio of and interrelationships among businesses), *business strategy* (focusing on developing a strategy that maximizes firm-specific comparative advantages to best compete in the marketplace), and *functional strategy* (reflecting efficient allocation of resources allocated to the particular function). Within this hierarchy, I/T strategy is at the functional level, with a charter of efficiently allocating its resources to best support the chosen business strategy. Thus, within these two roles, I/T strategy reflects a functional, efficiency orientation (King, 1978).

In contrast, the *competitive* role represents a significant point of departure. Extending beyond internal, efficiency focus, the capability now exists for organizations to deploy new I/T applications that leverage information and technological attributes to obtain differential sources of competitive advantages in the marketplace (Cash and Konsynski, 1985; Copeland and McKenney, 1988; McFarlan, 1984; Venkatraman and Kambil, 1990). Increased attention is being paid to

the potential role of I/T to influence structural characteristics of markets (e.g., Clemons and Row, 1988) as well as shape the basis of competition (see for instance, Rotemberg and Saloner, 1990; Malone, Yates, and Benjamin, 1986). It is becoming increasingly clear that a limited consideration of the first two roles for I/T in modern corporation is sub-optimal with potentially dysfunctional consequences.

More importantly, the emergence of the competitive role has significant implications for organizational transformation. This is because the mere superimposition of powerful I/T capabilities on the existing organizational structure and processes is unlikely to yield superior competitive benefits. This is supported by one of the central messages from the recently concluded MIT Research Project, *Management in the 1990s* (Scott Morton, 1990) that successful organizations can be distinguished by their ability to leverage I/T capabilities to transform their businesses (structures, processes, and roles) to obtain new and powerful sources of competitive advantages in the marketplace.

While we are on the threshold of the competitive role, we also note that the existing frameworks are limited in terms of their ability to provide fundamental insights and guidance. The administrative role is supported by frameworks such as: Critical Success Factors (Rockart, 1979; Davis, 1979), while the second, operational role is supported by frameworks like: Business System Planning (IBM Corporation, 1981) or Value Chain analysis (Porter and Millar, 1985). However, insights for leveraging the competitive role, being sufficiently different from the other two, cannot be obtained from the above frameworks.

Nevertheless, several frameworks have been proposed to address the challenge of recognizing the competitive role of I/T. These include: Parsons' (1983) articulation of different levels of impact of I/T in the marketplace; McFarlan's (1984) adaptation of Porter's competitive strategy framework to a context characterized by the deployment of I/T applications; Rockart and Scott Morton's (1984) adaptation of

Leavitt's (1965) organization theory model; as well as other frameworks rooted in a set of convenient dimensions (e.g., Wiseman, 1985; Hammer and Mangurian, 1987). Based on a general assessment of these frameworks (for a systematic approach to organizing these frameworks, see Earl, 1988), we argue that they are useful for describing and highlighting the emerging interconnection between I/T capabilities and organizational actions, but they fail in their lack of articulation of the fundamental logic and rationale for exploiting I/T capabilities as well as the complexities of the organizational transformation required to leverage technological capabilities. More specifically, they fail to simultaneously address the business (external) and organizational (internal) requirements of transformation enabled and shaped by new and powerful I/T capabilities. This paper aims to address the need by offering a model to link organizational transformation and the exploitation of I/T capabilities in its *competitive* role.

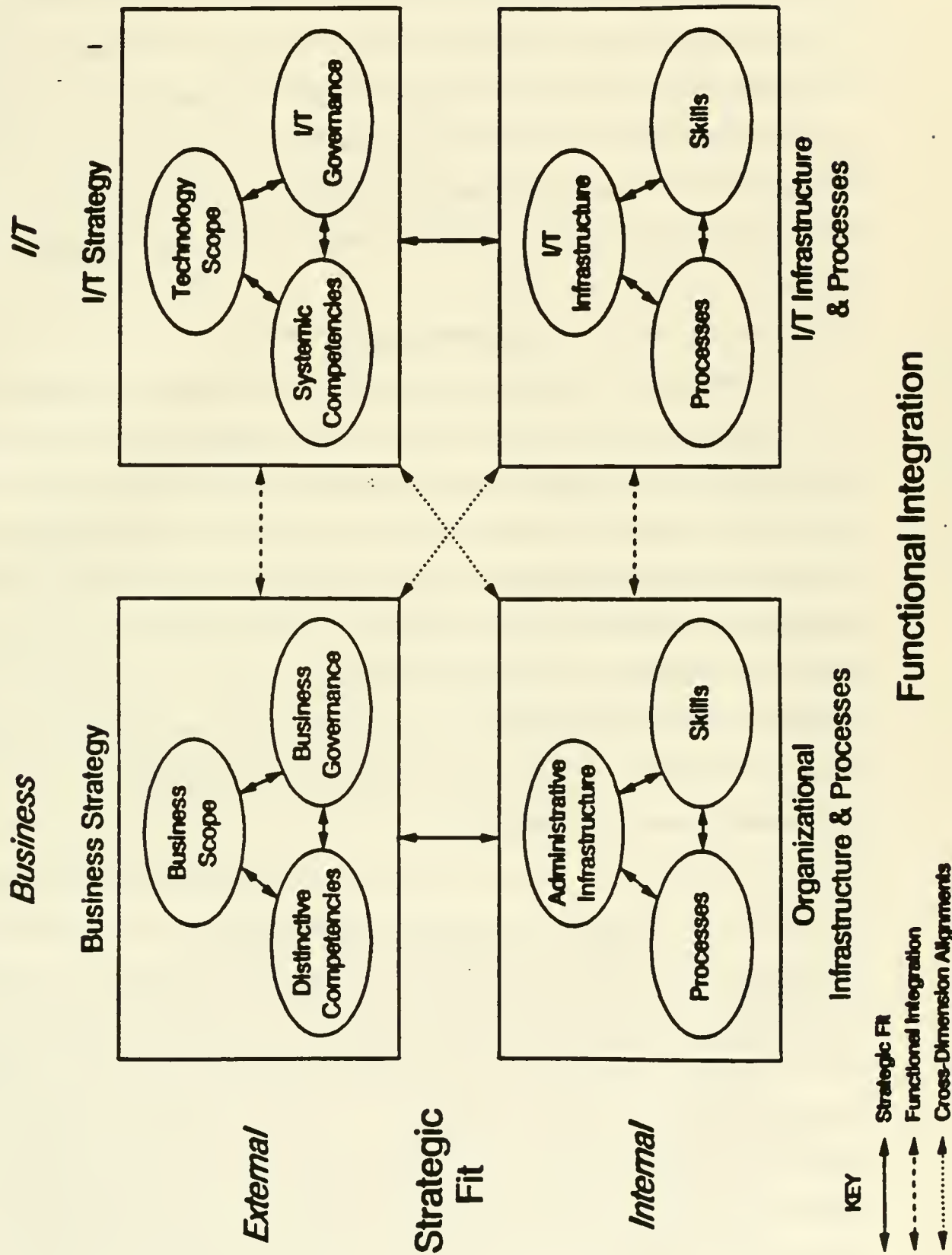
Proposed Strategic Alignment Model

The proposed model is depicted in Figure 1. It is based on four key domains of strategic choice: business strategy, organizational infrastructure and processes; I/T strategy; and I/T infrastructure and processes. We briefly describe each domain and subsequently articulate the distinctive features of the model.

Business Strategy

If we view organizational transformation from a 'voluntaristic' as opposed to a 'deterministic' perspective (Astley and Van de Ven, 1983; Miles and Snow, 1978), then business strategy is a central concept. However, the concept of strategy is overarching (Andrews, 1971; Hax and Majluf, 1984) and covers a broad terrain with multiple meanings, definitions and conceptualizations (Venkatraman and Grant, 1986; Venkatraman, 1989b). Nevertheless, most discussions deal with three central questions: (a) *business scope* -- choices pertaining to product-market offerings (Hofer

Figure 1
The Proposed Strategic Alignment Model



and Schendel, 1978); (b) *distinctive competencies* -- those attributes of strategy (e.g., pricing, quality, value-added service, superior distribution channels) that contribute to a distinctive, comparative advantage over other competitors (Porter, 1980; Snow & Hrebiniak, 1980); and (c) *business governance* -- choices of structural mechanisms to organize the business operations (e.g., strategic alliances, joint ventures, and licensing) that recognize the continuum between markets and hierarchy (Williamson, 1985; Jarillo, 1985).

Organizational Infrastructure and Processes

The relevance of including organizational infrastructure and processes need not be extensively justified in the context of organizational transformation. However, given the challenge to specify a parsimonious set of dimensions, we consider the following: (a) *administrative infrastructure* -- including organizational structure, roles and reporting relationships (Galbraith, 1974); (b) *processes* -- the articulation of workflows and the associated information flows for carrying out the key activities (Thompson, 1967; Zuboff, 1988); and (c) *skills* -- the capabilities of the individuals and the organization to execute the key tasks that support a business strategy (Fombrun, Tichy, & Devanna, 1985; Scott Morton, 1990).

Information Technology Strategy

The concept of I/T strategy is relatively new and hence open to differing definitions and assumptions. Analogous to business strategy, we conceptualize I/T strategy in terms of three dimensions: (a) *information technology scope* -- refers to the types and range of I/T systems and capabilities (e.g., electronic imaging systems, local- and wide- area networks, expert systems, robotics, etc.) potentially available to the organization; (b) *systemic competencies* -- focusing on those distinctive attributes of I/T competencies (e.g., higher system reliability, interconnectivity, flexibility) that contribute positively to the creation of new business strategies or better support existing business strategy; and (c) *I/T governance* -- choices of

structural mechanisms (e.g., joint ventures, long-term contracts, equity partnerships, joint R&D, etc.) to obtain the required I/T capabilities, involving issues such as the deployment of proprietary versus common networks (Barrett & Konsynski, 1982; Rotemberg & Saloner, 1990; Venkatraman, 1990) as well as strategic choices pertaining to development of partnerships to exploit I/T capabilities and services (Henderson, 1990; Johnston & Lawrence, 1988; Johnston & Vitale, 1988; Koh & Venkatraman, 1989).

Information Technology Infrastructure and Processes

Analogous to organization infrastructure and processes, this domain is defined in terms of three dimensions: (a) *architecture* -- choices pertaining to applications, data, and technology configurations (see for instance, Zachman, 1986; Parker, Benson & Trainor 1988); (b) *processes* -- concerned with the work processes central to the operations of the I/T infrastructure, including processes for systems development, maintenance, as well as monitoring and control systems (Bostom and Heines, 1977; Henderson, Rockart, and Sifonis, 1987; Janson and Smith, 1985; Marcus and Robey, 1978; Martin, 1982a, b; Raghunathan and King, 1988; Rockart and Short, 1989); and (c) *skills* -- choices pertaining to the knowledge and capabilities required to effectively manage the I/T infrastructure within the organization (Martin, 1982; Mumford, 1981; Strassman, 1985).

Distinctive Features of the Model

Before proceeding further, it is useful to enumerate the distinctive features of the proposed strategic alignment model. Specifically, we highlight two features: (i) distinguishing I/T strategy from I/T infrastructure and processes; and (ii) differentiating the concept of strategic alignment from bivariate fit (relationships involving any two domains discussed earlier) and cross-domain alignment (relationships involving three domains). Subsequently, we conclude with a

discussion on strategic alignment as a central element of organizational transformation.

Distinguishing I/T Strategy From I/T Infrastructure and Processes

The first feature relates to the distinction between I/T strategy and I/T infrastructure and processes, which is critical given the general lack of consensus on what constitutes I/T strategy. So, we build from the literature on business strategy, where there is a clear distinction between *external alignment*: positioning the business in the external product-market space and *internal arrangement*: design of organizational structure, processes and systems (see for instance, Snow and Miles, 1983). Within the I/T arena, given the historical predisposition to view it as a functional strategy, such a distinction has neither been made nor considered necessary. However, as we consider the potential that exists to leverage emerging I/T capabilities to redefine market structure characteristics as well as reorient the attributes of competitive success, the limitation of a functional view is readily apparent.

Indeed, the hierarchical view of the interrelationship between business and functional strategies is increasingly being questioned given the prevalent feeling that the subordination of functional strategies to business strategy may be too restrictive to exploit potential sources of competitive advantage that lie at the functional level. Accordingly, functions are being considered as sources of competitive, firm-specific advantage. Key emerging themes include: 'strategic marketing management' -- recognizing the exploitation of sources of marketing advantages at the business strategy level (e.g., Wind & Robertson, 1983); 'strategic human resource management' -- highlighting the explicit consideration of human resource profiles and capabilities in the formulation and implementation of strategies (e.g., Fombrun, Tichy & Devanna, 1985); notions of 'manufacturing as a competitive weapon' -- illustrating the potential sources of advantages that lie

within the production and manufacturing function (e.g., Wheelright, 1984), as well as exploring the linkage between finance and corporate strategy (Myers, 1984). A common theme is the recognition of an external marketplace: where these function-specific advantages could be leveraged; and an internal organizational function -- where the function-activities should be managed efficiently.

Following this tradition, we distinguish in the strategic alignment model, I/T strategy from I/T infrastructure and processes. Four different business examples are invoked to illustrate the distinction. One, the decision by *American Express* to commit a high level of resources to its electronic imaging technology platform as a key capability to provide value-added services (via providing copies of receipts with the monthly statements) as a means of differentiating its travel-related services is related to its I/T scope as well as systemic capabilities -- which are conceptually different from its internal management of its data centers or its global telecommunications network. Both are necessary for efficient leveraging of I/T capabilities, but one falls within the purview of external domain, while the other is concerned with internal operations. Second, *Eastman Kodak's* decision to outsource its data center operations to *IBM* is related to critical 'make-versus-buy' choices (I/T governance) in the I/T marketplace and is logically distinguished from its decision of centralizing and decentralizing systems development activities across its different business units.

The third example is provided by *McGraw Hill's* custom publishing strategy in its textbook business. It has recently developed a strategy of offering custom textbooks as an alternative to standard textbooks via its sophisticated electronic imaging technology infrastructure in a three way joint-venture with *Eastman Kodak* and *RR Donnelley & Sons*. This I/T based business capability, which reflects its I/T strategy that shapes and supports its business strategy is to be conceptually distinguished from its internal I/T infrastructure and operational systems. Finally,

Baxter Healthcare -- known for its Analytical Systems Automated Purchasing (ASAP) -- recently announced the formation of a joint venture with IBM for providing software, hardware, and information-based services to the hospitals, thus reflecting its I/T governance posture of collaboration, which is to be distinguished from its internal management of the information systems function. Collectively, these four business examples illustrate the importance of the three dimensions of I/T strategy delineated in Figure 1 as well as argue for the separation of I/T strategy from internal management of the IS function.

Differentiating Strategic Alignment From Bivariate Fit and Cross-domain Alignment

The proposed strategic alignment model is more than the articulation of the underlying axes, the four domains and their constituent dimensions. It derives its value from the different types of relationships among the four domains. Specifically, three dominant types of relationships can be delineated in the model depicted in Figure 1. These are termed as: bivariate fit; cross-domain alignment; and strategic alignment.

Bivariate Fit. The simplest type of relationship is a *bivariate* one -- linking two domains, either horizontally or vertically. The bivariate relationship between business strategy and organization infrastructure and processes is the classic strategy-structure fit that has been a dominant theme in organizational strategy research (Chandler, 1962; Rumelt, 1974; for an overview, see Venkatraman and Camillus, 1984). Correspondingly, we specify a bivariate relationship between I/T Strategy and I/T infrastructure and processes in this model, highlighting the need to interconnect an organization's external positioning in the I/T marketplace with its approach to managing the IS function in its organizational context. These two relationships represent the classic strategy formulation-implementation perspectives for the two strategies considered here: business strategy and I/T strategy.

In contrast, the other two bivariate relationships link the domains horizontally. The links between business strategy and I/T strategy (i.e., articulation of the required I/T scope, development of systemic competencies as well as I/T governance mechanisms) reflects the capability to leverage I/T strategy to both shape and support business strategy. This is particularly relevant for the competitive role of the I/T function discussed earlier. Correspondingly, the link between organizational infrastructure and processes and I/T infrastructure and processes reflects the need to ensure internal coherence between the organizational requirements and expectations on the one hand, and the delivery capability within the IS function, on the other hand -- which is consistent with the notion of viewing IS as a 'business within a business' (Cash, McFarlan, and McKenney, 1988).

Benefits and Limitations of Bivariate Fit. A major benefit of the bivariate fit perspective lies in its simplification of the relevant domain, invoking *ceteris paribus* conditions. If for instance, the organizational and IS infrastructures can be reconfigured easily, then a bivariate interconnection between business and I/T strategies could suffice. However, most instances of organizational transformation require adaptation across a complex set of multiple domains, thus limiting the value of bivariate perspectives. An obvious approach lies in the consideration of multiple bivariate relationships, which could lead to an error of 'logical typing' or 'reductionism' (Bateson, 1979; Miller and Mintzberg, 1983; Venkatraman, 1989a).

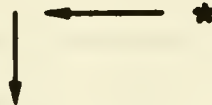
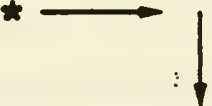
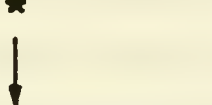
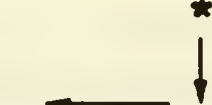
Indeed, a major area of controversy in the literature on organizations relates to the distinction between bivariate relationships among a narrow set of variables and multivariate, holistic relationships among a set of variables representing an organizational system (Miller and Friesen, 1982; McKelvey, 1975; see also Alexander, 1964). The main controversy is that if one were to decompose the system into a set of bivariate relationships, there exists a serious possibility of internal logical inconsistencies (or, mutually conflicting directions) among multiple pairwise

contingencies. As Child remarked: "What happens when a configuration of different contingencies are found, each having distinctive implications for organizational design?" (1975; p.175). Extending this to the present context of strategic I/T management, the limitation lies in considerations of external perspectives only (via business and IT strategies without any regard for the internal considerations) or internal perspectives only (via integrating the IS functions and activities within the overall organizational infrastructure). Alternatively, the bivariate fit could involve considerations of business and IT perspectives separately, which have been argued to be dysfunctional (see for instance, King, 1978; Pyburn, 1983; McLean and Soden, 1981). This calls for the recognition of multivariate relationships, or more precisely, cross-domain relationships discussed below.

Cross-domain alignment. The first type of multi-domain relationship involves three domains, linked sequentially. This can be conceptualized as a triangle overlaid on the model shown in Figure 1. Although eight combinations of cross-domain alignments are possible, we argue that four are particularly important and managerially relevant for our discussion here. These are summarized in Table 1 and are labeled as: strategy implementation, technology exploitation, technology leverage, and technology implementation.

Strategy implementation, as depicted in Table 1, is a cross-domain perspective that involves the assessment of the implications of implementing the chosen business strategy via appropriate organizational infrastructure and management processes as well as the design and development of the required internal I/T infrastructure and processes. This is, perhaps, the most common and widely understood cross-domain perspective as it corresponds to the classic, hierarchical view of strategic management (see for instance the three-level hierarchy in Hax and Majluf, 1984). Given its widespread acceptance, it is not surprising that several different analytical methodologies are available to operationalize this perspective,

Table 1
Four Dominant Perspectives on I/T Planning

Label	Cross-Domain Perspective	Common Domain Anchor	I/T Planning Method Example
(1) Technology Exploitation		Technology Strategy	Opportunity Identification (Sharpe 1989) Value Chain Analysis (Cash)
(2) Technology Leverage		Business Strategy	G/CUE (Gartner Group 1989)
(3) Strategy Implementation		Business Strategy	CSF (Rockart 1979) Enterprise Modeling (Martin 1982)
(4) Technology Implementation		Technology Strategy	Service-level Contracting (Leithelser & Wetherbe 1986)

* Domain Anchor

where the more popular approaches include: critical success factors (Rockart, 1979), business systems planning (IBM Corporation, 1981) and enterprise modeling (Martin, 1982).

Technology exploitation, as shown in Table 1, reflects the potential of I/T strategy to influence key dimensions of business strategy. Within the 'competitive role' for I/T, this perspective is concerned with the exploitation of emerging I/T capabilities to impact new products and services (i.e., business scope), influence the key attributes of strategy (distinctive competencies) as well as develop new forms of relationships (i.e., business governance). Unlike the previous perspective that considers business strategy as given (or, a constraint for organizational transformation), this perspective allows the modification of business strategy via emerging I/T capabilities. Beginning with the three dimensions of I/T strategy, this perspective seeks to identify the best set of strategic options for business strategy and the corresponding set of decisions pertaining to organizational infrastructure and processes.

Key examples of the *technology exploitation* perspective include: the exploitation by *Baxter Healthcare* (previously, American Hospital Supply Corporation) via its proprietary *ASAP* electronic order-entry system to deliver superior, value-added service to its hospital customers and the consequent implications for redesigning the internal organizational processes (see for instance, Venkatraman and Short, 1990); the attempt by *Federal Express* to create a new standard for overnight delivery through its *COSMOS/PULSAR* system and the corresponding implications for redesigning its internal processes; and the ability of American Express, IDS division to leverage its I/T infrastructure to develop capabilities for electronically filing income tax returns as well as leveraging the information for tailoring its financial products to the individual needs (Venkatraman and Kambil, 1990).

Thus, while much of the current excitement about I/T in its competitive role lies in the technology exploitation perspective, the discussion has been at the level of the bivariate fit between I/T strategy and business strategy (see for instance, McFarlan, 1984; Wiseman, 1985). We argue that any consideration of the attractiveness of the emerging I/T capabilities without corresponding attention to the redesign of internal operations is seriously limited with negative consequences for organizational transformation. This is because performance is clearly a function of both formulation and implementation of strategies, and myopic attention to any one at the expense of the other could obscure the best possible mode for organizational transformation.

Technology leverage, as shown in Table 1, is a cross-domain perspective that involves the assessment of the implications of implementing the chosen business strategy through appropriate I/T strategy and the articulation of the required IS functional infrastructure and systemic processes. The underlying rationale is that business strategy is best executed by leveraging the emerging technological capabilities rather than through the design of an efficient internal organization. For example: *USAA*, a leading US insurance company, decided that the best strategic option involved the development of a superior document handling system based on state-of-the-art electronic imaging technology. This was accomplished through a joint development venture with a key vendor, involving fundamental changes to the internal I/T infrastructure: data, applications, and configurations.

Another example is *American Express Travel Related Services*, whose business strategy anchored on two technology-based competencies: quick approval of purchases and providing copies of receipts to the cardholders. Approval process on a charge card (i.e., without any pre-set spending limit) typically has a longer lead-time than a corresponding transaction involving their competitors' credit card (with a pre-set spending limit). It was imperative that American Express at least match the

response time of its leading competitors, failing which the cardholder may switch to an alternative, faster-transacting card. This business strategy required a systemic competence involving expert systems (*Authorizer's Assistant*) as well as corresponding changes in the internal IS organization for developing, maintaining and controlling the systems. The second component, termed as ECCB (Enhanced Country Club Billing) refers to their business competence of providing copies of all charge slips with the monthly statement. While cardholders expressed satisfaction with this service, the cost of maintaining and distributing the slips was becoming prohibitive in the traditional mode. However, an optical scanning, storage, and laser-printing system allowed the delivery of the same level of service more efficiently.

In terms of the proposed strategic alignment model, these examples highlight the *impact* of business strategy (distinctive competence) on I/T strategy (I/T governance and systemic competencies respectively) and the corresponding implications for I/T infrastructure and processes (e.g., IS architectures). Again, the limitations of a bivariate fit perspective are apparent. Either a formulation view (e.g., the impact of business scope on I/T scope or systemic competencies) or an implementation view (i.e., the implications of systemic competencies or new I/T governance for internal IS operations) is limited in terms of its coverage. Some emerging analytical perspectives are beginning to reflect *technology leverage*. As an example, Gartner's G/CUE (Gartner Group, 1989) examines an organization's business strategy and develops implications for I/T strategy with respect to key trends in the I/T markets via technology scanning, scenarios as well as identify the implications for migrating from the current I/T infrastructure to the desired state.

Technology implementation, as depicted in Figure 1, is concerned with the strategic fit between the external articulation of I/T strategy and the internal implementation of the I/T infrastructure and processes with corresponding impact

on the overall organizational infrastructure and processes. In this perspective, the role of business strategy is minimal and indirect and is best viewed as providing the necessary administrative support for the internal organization. This perspective is often viewed as a necessary (but not sufficient) to ensure the effective use of I/T resources and be responsive to the growing and fast-changing demands of the end-user population. Analytical methodologies even partially reflecting this perspective requires a systematic analysis of the I/T markets as well as possible service contracting approaches. Examples of analytical methods include: end-user need surveying (Alloway and Quillard, 1983), service-level contracting (Leitheiser and Wetherbe, 1986) and architectural planning (Zachman, 1986).

By way of summarizing the discussion on four cross-domain perspectives, we develop the following propositions:

P1: The effectiveness of strategic I/T management will be significantly greater for any cross-domain perspective than any bivariate fit relationships.

P2: On average, the four cross-domain perspectives for strategic I/T management will be equally effective.

The rationale for the first proposition is derived from the preceding discussion on the limitations of bivariate relationships in a complex organizational system and the need to integrate across external and internal domains as well as across business and technology domains. The rationale for the second proposition is based on the principle of equifinality – i.e., multiple equally effective approaches to exploiting technology for organizational transformation, where the universal superiority of one approach over another cannot be *a priori* argued.

Further, from Figure 1 and Table 1, it is clear that the four four perspectives discussed above reflect a top-down orientation -- where either business strategy or I/T strategy direct the subsequent internal (organizational) considerations. As recognized earlier, it is entirely conceivable to consider corresponding bottom-up

orientations. For example, the organization infrastructure could serve as a domain anchor for a process that considers the impact of organizational capabilities on business strategy and the subsequent implications for I/T strategy. Such perspectives would signal the recognition of the current organizational infrastructure or I/T infrastructure as the relevant starting points for deriving implications for the external, strategic choices. Thus, while the top-down orientations reflect the preference of strategic managers as well as the rational, analytic approach as adopted here, it is important to recognize that the proposed strategic alignment model does accommodate the possible existence of internally-consistent, bottom-up analysis of cross-domain relationships. In the interest of space and given the relatively limited prior attention to these perspectives, these are not discussed here.

Strategic Alignment. The final type of relationship in the proposed model is strategic alignment. It involves *simultaneous or concurrent attention to all four domains* and can be conceptualized in its weak and strong forms. In its weak form, it can be conceptualized in terms of a *single-loop transformation process* across the four domains, while in its strong form, it should be viewed as a *double-loop transformation process*. The notion of a loop requires the specification of a starting point as well as a particular direction of transformation, and hence the distinction between a single-loop and a double-loop process (see Argyris, 1977; 1982). The former accommodates only one single direction of transformation, while the latter recognizes the centrality of both possible directions. The logic underlying strategic alignment is elaborated below by invoking two theoretical concepts: completeness and validity.

Completeness is a central concept of strategic alignment because it is clear that lack of considerations of any one of the four domains will leave unrecognized one domain and the consequent relationships. As discussed above each of the four dominant cross-domain perspectives does not recognize (i.e., takes as given and

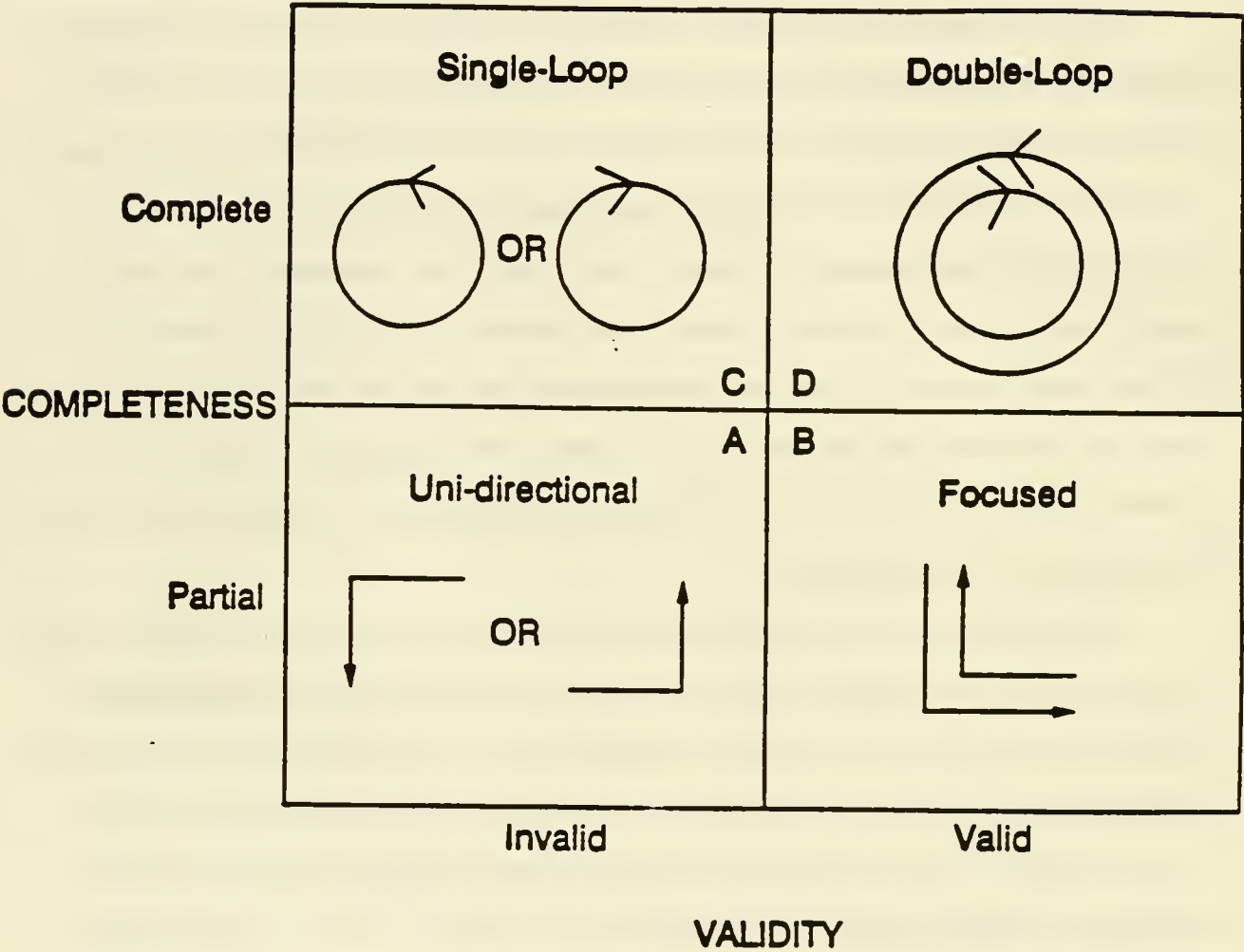
fixed) one of the four domains. For instance, *technology exploitation* (Table 1) does not recognize critical issues pertaining to I/T infrastructure, and is therefore, incomplete. Given the critical interplay among the four domains, we argue for the importance of completeness, or more formally, *single-loop transformational process*.

Validity refers to the degree of attention to explicitly overcome the possibility of bias via unrecognized or hidden frames of reference. A major concern raised by Churchman (1971), Mason and Mitroff (1981) and Weick (1979) within the context of a decision-making process, relates to the potential threat to validity of decisions introduced by the existence of a domain anchor or a fixed reference frame that remains unchallenged (for a discussion within the IS context, see Henderson and Sifonis, 1988). Following Mason and Mitroff (1981) and Argyris (1977; 1982), we call for an analytical method that explicitly challenges the assumption of a given domain anchor. More formally, the analytical method should incorporate a *double-loop transformational process*.

Figure 2 schematically represents the different types of relationships discussed above, excluding bivariate fit -- which was argued to be myopic and dysfunctional. Specifically, two types of cross-domain perspectives exist: uni-directional or focused. The distinction is that the latter recognizes the potential sources of invalidity (or biases) and provides a correction mechanism in the pairing of the cross-domain perspectives. Extending beyond cross-domain perspectives, two forms of strategic alignment can be specified -- the weak-form represented as single-loop and the strong-form specified in terms of the double-loop process. Thus, we develop the following proposition:

P3: The effectiveness of strategic I/T management is significantly greater for a complete process than for any type of cross-domain alignments, under *ceteris paribus* conditions.

Figure 2
- Strategic I/T Management Effectiveness



P3: $\Pi_A < \Pi_B = \Pi_C < \Pi_D$

We argue that much of the failure to translate the available opportunities to leverage I/T for superior organizational performance lies in the incompleteness of the process described above. In other words, while adequate attention may be given to the four domains, it may not still represent a complete process as depicted in Figure 2. As an illustration: in our field research, we encountered a strategic IT management process that paid due attention to all the four domains represented in our strategic alignment model (Figure 1), but still was considered ineffective by the managers. Detailed interviews and further analysis of their process indicated that the first step reflected *technology exploitation* and the second *strategy implementation*. Both analytical steps were supported by well-known analytical methodologies. However, as shown in Table 1, such a process does not address the relationship between I/T strategy and I/T infrastructure and processes. In other words, while the relationship between business strategy and organizational infrastructure and processes was assessed twice, the process did not evaluate the feasibility of translating I/T strategy into appropriate systems and processes within the IS function. Indeed, migration problems across different generations of systems emerged as a major contributor to the project's failure. More formally, we term this as an incomplete process and hence is weaker than a process that considers consistent, cross-domain perspectives.

Other propositions derived from Figure 2 are as follows:

P4: On average, the uni-directional perspective is the least effective process for strategic I/T management.

The rationale for this proposition is based on the fact that this perspective neither reflects completeness nor validity. In other words, it carries the risks associated with incompleteness as well as the failure to challenge the domain anchor. In the absence of both critical requirements of strategic I/T management, it is straightforward to argue that this is least effective.

P5: On average, single-loop (i.e., complete but invalid) and focused (incomplete but valid) processes will be equally effective and superior to unidirectional process for strategic I/T management.

Our rationale for the above proposition rests on the importance of completeness and validity in addressing strategic I/T issues. Although both forms of strategic I/T processes are currently used (Rockart, 1979; Boynton and Zmud, 1987), there is a lack of prior theory on the relative importance of completeness versus validity. Thus, while we argue that the single-loop and focused processes are superior than a uni-directional process, we refrain from any further delineation of the relative effectiveness of these two approaches.

P6: On average, double-loop (i.e., complete but invalid) and focused (incomplete but valid) processes will be equally effective and superior to unidirectional process for strategic I/T management.

Essentially, this proposition argues that a complete and valid process will be the most effective approach to strategic I/T management. Such an approach not only addresses all the four relevant domains but also seeks to challenge the assumptions inherent in the domain anchors. However, it has a major limitation in terms of high levels of resources -- both time and costs, which need to be recognized and managed depending on the specific contingencies faced by the organization.

Strategic Alignment As an Element of Organizational Transformation

This paper developed a model of organizational transformation that specifically addressed the requirements of leveraging the emerging developments in information technologies. This model is based on the need to achieve alignment across internal and external domains as well as functional integration across business and I/T areas. The value of the model is argued with propositions for research and practice. While this paper has provided some support for the conceptual validity of the model, the

empirical validity leading to the confirmation or falsification of the propositions require systematic field research. We are in the midst of operationalizing the key constructs and collecting multi-period data to test the propositions offered here.

Over two decades ago, Thompson (1967; 147) noted, "Survival rests on the co-alignment of technology and task environment with a viable domain, and of organizational design and structure appropriate to that domain." These observations are equally valid today and apply well to the present context of exploiting I/T capabilities for organization design. Our position is that strategic alignment -- especially between business and I/T strategies across external and internal domains -- is an important element of the larger organizational transformation process. Specifically, we discuss the usefulness of the model along three lines: (a) descriptive model; (b) prescriptive model; and (c) dynamic model.

Strategic Alignment as a Descriptive Model. At a first level, the proposed strategic alignment model can be viewed as a descriptive model of organizational transformation. Specifically, it can be used to identify the key factors to be considered (i.e., the four domains and the twelve constituent dimensions shown in Figure 1) as well as alternate directionality of transformation (i.e., the different cross-domain perspectives shown in Table 1). The power of the model lies in (a) the parsimonious delineation of the dimensions and (b) the conceptual separation of I/T strategy from the internal, I/T infrastructure and processes. From a research point of view, this model can be used to describe and categorize the emerging examples of exploiting I/T as a lever for business transformation. From a management decision-making point of view, this model serves the purpose of identifying the different alternatives to leverage I/T for business transformations. We are aware of several organizations adopting this as the central model in their strategic management process, where I/T plays a critical role in business transformation.

Strategic Alignment as a Prescriptive Model. At a second level, the proposed model can be viewed as prescribing certain alternatives and approaches. Prescriptive frameworks derive their logic and rationale from underlying theoretical arguments and/or empirical results. While there are preliminary theoretical support for some of the cross-domain perspectives, we do not yet see it as a prescriptive model until we have tested these propositions with empirical data. This is because we are in agreement with Mintzberg (1977) who noted, "There has been a tendency to prescribe prematurely in management policy -- to tell how it should be done without studying how it is done and why..... Prescriptions become useful only when it is grounded in sophisticated description." (pp 91-92). We believe that the topic of strategic management of I/T is in a similar position -- with excessive prescription based on isolated cases, which is counterproductive for both theory and practice. We are now in the midst of accumulating a set of empirical observations using this conceptual model to understand the patterns of realizing value from I/T investments with the ultimate aim of developing this into a prescriptive model.

Strategic Alignment as a Dynamic Model. Implicit in the discussions throughout is that strategic alignment is a dynamic concept, that is best viewed as 'shooting at a moving target'. One of the managers interviewed in connection with the research project noted that this model is best viewed as a 'journey and not as an event.' This is analogous to Miles and Snow (1978) argument that the organizational adaptive cycle -- which provides a means of conceptualizing the major elements of adaptation and of visualizing the relationships among them -- is a central concept of strategic management (p.27). It is also consistent with Thompson (1967) who noted that alignment is

"not a simple combination of static components. Each of the elements involved in the [co-]alignment has its own dynamics [and] behaves at its own rate, governed by the forces external to the organization.

.....if the elements necessary to the co-alignment are in part influenced by powerful forces in the organization's environment, then organization survival requires *adaptive* as well as *directive* action in those areas where the organization maintains discretion. As environments change, the administrative process must deal not just with which domain, but how and how fast to change the design, structure, or technology of the organization." (emphasis in original; 1967; pp 147-148).

Accordingly, we view the strategic alignment model as a dynamic model of strategic I/T management requiring the organization to delineate the areas where it should maintain discretion (involving both the business and I/T domains) as well as identify the approaches to transform the internal organization structures and processes. However, we recognize that a dynamic perspective does not imply the need to manipulate and adapt all dimensions at all times, nor is predictable in terms of specific trigger points (Thompson, 1967; Child, 1972; Miles and Snow, 1978). Indeed, the key strategic I/T management challenge lies in the identification of those strategic dimensions that require modification under different contingencies for enhancing organizational performance. It is our hope that our detailed research project will offer some normative guidelines for recognizing and responding to critical contingencies.

Thus, in closing: our view of business transformation explicitly recognizes the organization at the *nexus* of key streams of actions involving a complex set of variables -- where the streams are dynamic in scope, moving in different directions and pace. We believe that the challenge of organizational transformation is best conceptualized as a dynamic strategic alignment process with particular considerations to those strategic components that matter at that point in time, and our argument has been that I/T occupies that role at present and in the foreseeable future. Hopefully,

this paper has provided a parsimonious model to conceptualize and manage one area of complexity inherent in managing today's organizations.

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